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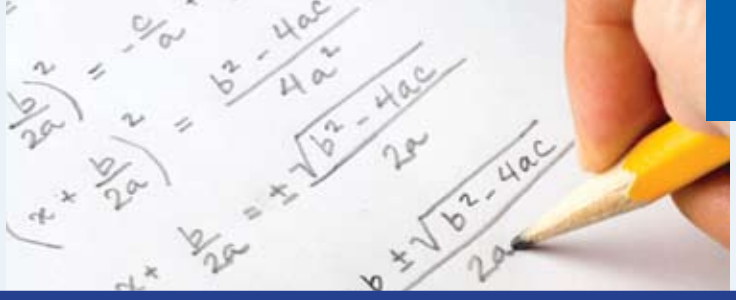
Clarifying Complex Education Issues®

PARENT/ STUDENT GUIDE



MAY 2009

Why It Is Important To Learn Algebra

Students in California need to take algebra and understand it before they complete high school because:

- They must pass Algebra I to earn a high school diploma.
- They must also pass the California High School Exit Exam (CAHSEE), which includes some Algebra I questions, to graduate.
- Beginning in fall 2009, students entering a California community college must pass at least Intermediate Algebra (Algebra II) to earn a two-year associate degree.

California's curriculum development process for math

The State Board of Education, appointed by the governor, is responsible for:

- Academic content standards, which are what students are expected to know and be able to do in math. Students are tested on these standards each spring.
- The Mathematics Framework, which guides educators in teaching the standards and publishers in developing instructional materials, such as textbooks.
- Instructional materials adoption based on this framework. Districts can then purchase approved textbooks and offer training to their teachers on how to use them to teach the math standards.

EdSource thanks the **Noyce Foundation** for underwriting the research, development, and dissemination of this publication.

Increasingly, state leaders expect schools to prepare all students to take Algebra I in either 8th or 9th grade. This is in part because the University of California (UC) and California State University (CSU) systems require students to take Algebra I, Geometry, and Algebra II in high school to qualify to enter college. And many of the more competitive public and private colleges prefer students who have completed math courses beyond Algebra II, such as Statistics for humanities majors or Calculus for math and science majors.

Why do California policymakers require all students to take algebra?

Educators believe that math, in general, helps students think logically. Algebra bolsters these logic skills and introduces abstract thinking. It gets across the idea that symbols such as *x* and *y* stand for numbers that vary and can be used to find missing pieces of a mathematical or real-life puzzle or to understand changing relationships. Algebra also helps students picture complicated concepts and relationships through creating and understanding graphic presentations of data.

"In algebra, students learn to reason symbolically, and the complexity and types of equations and problems that they are able to solve increase dramatically as a consequence," according to California's Mathematics Framework, which guides the state's educators. This ability to grasp complex, changing, and abstract concepts stimulates the brain, helping students learn how to think in new ways. Algebra also helps students organize their thinking, making it easier for them to craft reasonable responses when confronted with complicated or dynamic situations.

Algebra helps prepare students for the future

These problem-solving and critical-thinking skills can help students succeed in their jobs and their lives even if they do not continue their education beyond high school or do not pursue a math- or science-oriented career. Algebra is important for future employment opportunities in California's increasingly knowledge-based economy, even in jobs considered to be "blue collar." For example, an applicant must have passed Algebra I to enter an electrician apprenticeship program.

But if students are aiming for college, algebra is essential. The techniques learned in algebra are the foundation for the higher-level mathematics and science courses required for entrance to most colleges:

- Researchers have found that the higher the level of math courses students take in high school, the greater chance those students will attend and graduate from college and find better paying jobs in the future.
- Besides requiring three years of high school math as mentioned above, UC and CSU also require two years of laboratory science courses for admission; and the more competitive campuses often prefer four years of science. Many higher-level high school science courses require algebra as a prerequisite.
- College entrance exams, such as the SAT and ACT, include many algebra-related questions.

What difference does it make when a student takes algebra?

Students who pass Algebra I in 8th or 9th grade have more academic options. Besides meeting the basic requirement for high school graduation, they:

- Have completed Algebra I before taking the California High School Exit Exam in 10th grade, making them better prepared to pass the math section of that exam.
- Can complete the minimum math course-taking requirement for eligibility to UC and CSU by 10th or 11th grade, allowing them to take advanced math beyond Algebra II in high school.
- Can participate in the Early Assessment Program in math, an expansion of state STAR testing offered to eligible 11th graders by most high schools. This test in mathematics—given only to juniors who are taking or have completed Algebra II—provides early feedback about college readiness and, if students do well, grants them an exemption from math placement testing at a CSU.

Those who pass Algebra I in 8th grade can take four years of higher-level math courses in high school and are also in a good position to take four years of science courses, including advanced placement or other honors courses that allow them to earn college credit in high school. Competitive universities look favorably on students who have taken such a rigorous schedule.

If students complete Algebra II by 10th grade, do they need to take more math courses in high school?

It is important for students to continue to take math courses in their junior and senior years even if they are not interested in pursuing a math- or science-related field. Math skills can grow rusty when not used, and students who have not taken math for two years may find that they cannot pass college math placement exams, thus setting them back in their pursuit of a degree.

In addition, as mentioned above, universities look positively on four years of math course-taking in high school.

How will I know if my student is ready to take Algebra I in 8th grade?

Students must be well prepared in elementary school and in 6th and 7th grade math to be successful in Algebra I in 8th grade.

Some school districts have exams they give to students to determine if they are ready for Algebra I. Often schools rely on the recommendation of a student's 7th grade math teacher. Parents can monitor their child's success in math by paying attention to the STAR report they receive each year, which shows how well each student is performing on California Standards Tests (CSTs) in math taken every spring. A score of "proficient" or "advanced" in math is one indication that your student understands the subject. The STAR report also breaks down math results by section so you can see how well your child is doing on each part of the math exam.

What about students who are having difficulty learning algebra?

Experts agree that moving from arithmetic to algebra is one of the toughest transitions students have to make. That is why it is important for students to be taught algebraic concepts early and focus on them as part of pre-algebra in sixth and seventh grade. Before students can succeed in Algebra I, they need to have key "readiness" skills. For example, they need to know how to convert fractions to decimals and percentages, have a basic understanding of graphs, and be able to solve multistep problems.

Teachers can test struggling students to diagnose what is keeping them from understanding the material. Teachers can also get help from others—including parents, Special Education specialists, and math experts—to develop approaches for each individual student. Talk with your child's math teacher about his or her progress and what you can do to help your student succeed. You can also talk to your school counselor or administrator to:

- Make sure that your student is appropriately placed in math and on track based on his or her goals.
- Find out if your middle school's math teachers have degrees or credentials to teach in math, or if they are participating in professional development.
- Ask if your child can take part in a math tutoring program offered by your school or district if he or she is struggling.

What about students who excel in math?

If your student excels in math and needs courses not offered in your school, see if a school official can arrange for special math instruction. Many middle schools allow advanced students to take high school math courses. Similarly, high school administrators can often arrange for students to take math courses at a community college or through computerized instruction.

How can I find out more?

- For more information on the state's approach to algebra–including an analysis of statewide performance results over time–see EdSource's May 2009 publication, *Algebra Policy in California: Great Expectations and Serious Challenges*, at: www.edsource.org/pub_algebra09.html
- For information on careers in math and science, see the free parent/student guide, *Math and Science: Gateways to California's Fastest-growing Careers* at: www.edsource.org/pub_mathscience1-08_careers.html
- Read the free *Parent Handbook for Mathematics*, published by the California Department of Education. It includes suggestions for home or family activities and resources to help students, and it provides an overview of the state's mathematics curriculum. Go to www.cde.ca.gov/pd/ca/ma and scroll down the alphabetical listing of resources to find the parent handbook.
- To find out more about CSU's Early Assessment Program, go to: www.calstate.edu/EAP
- You can find the *Mathematics Framework for California Public Schools* at this website: www.cde.ca.gov/ci/ma/cf
- For background information on academic content standards, go to this website: www.edsource.org/iss_sta_standards.html

For a Spanish translation of this guide, go to: www.edsource.org/pub_algebra09_QA_span.html

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